Bulletin of the Museum of Comparative Zoology

AT HARVARD COLLEGE

VOL. 119, NO. 9

THE GENUS TETRAGNATHA (ARANEAE, ARGIOPIDAE) IN MICHIGAN

BY ARTHUR M. CHICKERING

Albion College

CAMBRIDGE, MASS., U.S.A.

PRINTED FOR THE MUSEUM

FEBRUARY, 1959

No. 9 — *The Genus Tetragnatha (Araneae, Argiopidae) in Michigan*

By Arthur M. Chickering

I have recently completed studies on the genus *Tetragnatha* Latreille, 1804, in Central America and the West Indies (1957). It was only natural, therefore, for me to turn my attention to the genus as it is known in Michigan. The present paper is an outgrowth of that decision and with it I return once more to the study of my collections of Michigan spiders which have been accumulating for thirty years. The paper is offered with the hope that it will be of some help to those who are in the process of becoming acquainted with this highly interesting segment of our local fauna.

Genus Tetragnatha Latreille, 1804

(Long-jawed orbweavers)

As Seeley (1928) has shown, *Eugnatha* and *Eucta* are synonyms of *Tetragnatha*. This genus, as now understood, may be defined as follows: The body is long and slender, usually several times as long as wide. The legs are long, slender, and usually spiny but there are notable exceptions, as in *T. tenuissima* O. P. Cambridge, widely distributed in Mexico, Central America, West Indies, and northern South America. When at rest, the two anterior pairs of legs are extended forward and the remaining two pairs are directed backward. In general, the carapace is somewhat oval, widest near the middle, flattened, and has a conspicuous median pit rather than a typical longitudinal groove. The eight eyes are in two rows which may be parallel, divergent, or convergent, but the lateral eyes are never contiguous. The chelicerae are usually very strongly developed, especially in males. There are numerous teeth along the fang groove on both margins and they are of considerable importance in the identification of species. However, the teeth are subject to differences in relative size, number, and relative position. Males always have a prolateral spur on the basal segment of the

chelicerae and this is also frequently of importance in determining species. The maxillae are essentially parallel, long, and dilated distally. The genital furrow is procurved and its shape can be used to some extent in distinguishing females, always more difficult to identify than are the males. A definite epigynum is entirely lacking in females. The spinnerets are terminal except in a few species in which the abdomen is considerably extended posteriorly.

Male palp: The cymbium is a narrow flap extending the whole length of the bulb. The paracymbium, attached to the base of the cymbium, often has a rather characteristic form peculiar to certain species. The conductor, in close association with the embolus, usually terminates in a characteristic form of specific value. All mature males which I have seen have a more or less conspicuous pit near the distal end of the cymbium suggestive of a sense organ.

The majority of the species in this genus appear to prefer to build their webs in grass and among the weeds in meadows close to water. I have collected large numbers among sedges and other plants over water in Panama and Jamaica. The webs are usually inclined but sometimes horizontal, with the spider at the open hub.

Key to the Species of Tetragnatha *in Michigan*

Males

1. Lateral eyes clearly further from one another than AME are from PME (*caudata, pallescens, straminea, vermiformis*) 2
1. Lateral eyes not clearly further from one another than AME are from PME; either definitely closer together than AME are to PME or about the same distance apart (*elongata, guatemalensis, harrodi, laboriosa, rusticana, versicolor*) 5
2. Palpal tibia much longer than palpal patella (*pallescens, straminea*) .. 3
2. Palpal tibia and palpal patella about the same length (*caudata, vermiformis*) 4
3. Basal segment of chelicera nearly as long as the cephalothorax; prolateral spur not definitely bifid but with a small tooth below apex ..... *pallescens*, p. 487
3. Basal segment of chelicera only a little more than half as long as the cephalothorax and definitely concave along outer border; prolateral spur clearly bifid at apex ..... *straminea*, p. 494

4. Abdomen definitely continued into a distinct "tail" posterior to spinnerets ..... *caudata*, p. 479
4. Abdomen not notably continued posterior to spinnerets ..... *vermiformis*, p. 495
5. Promargin of fang groove with a very large tooth near the middle of the row of promarginal teeth (*elongata, laboriosa, rusticana, versicolor*) 6
5. Promargin of fang groove without a very large tooth near the middle of the row of promarginal teeth (*guatemalensis, harrodi*) 9
6. Conductor of palp somewhat club-shaped distally, bluntly rounded and with a more or less conspicuous oval concavity near distal end ..... *versicolor*, p. 497
6. Conductor of palp not club-shaped distally and without any conspicuous oval concavity near distal end 7
7. Palpal tibia much elongated; twice as long as palpal patella ..... *elongata*, p. 480
7. Palpal tibia not so notably elongated; less than twice as long as palpal patella 8
8. Palpal conductor terminating in a beak-like structure; palpal tibia only slightly longer than palpal patella ..... *laboriosa*, p. 486
8. Palpal conductor terminating in a complicated hooked structure with a small rounded concavity behind the hooks; palpal tibia considerably longer than palpal patella ..... *rusticana*, p. 489
9. Paracymbium of male palp terminating in a long, slender, digital extension ..... *guatemalensis*, p. 482
9. Paracymbium terminating in a bluntly rounded distal end, not extended into a slender digital structure ..... *harrodi*, p. 484

Females

1. Lateral eyes clearly further from one another than AME are from PME (*caudata, pallescens, straminea, vermiformis*) 2
1. Lateral eyes not clearly further from one another than AME are from PME; either definitely closer together than AME are to PME or about the same distance apart (*elongata, guatemalensis, harrodi, laboriosa, rusticana, versicolor*) 5
2. Abdomen considerably extended into a "tail" posterior to spinnerets ..... *caudata*, p. 479
2. Abdomen at most only extended a short distance posterior to spinnerets (*pallescens, straminea, vermiformis*) 3
3. With a small dorsal tubercular tooth on fang near base; with a blunt tubercular tooth on basal segment of chelicera near base of fang ..... *straminea*, p. 494

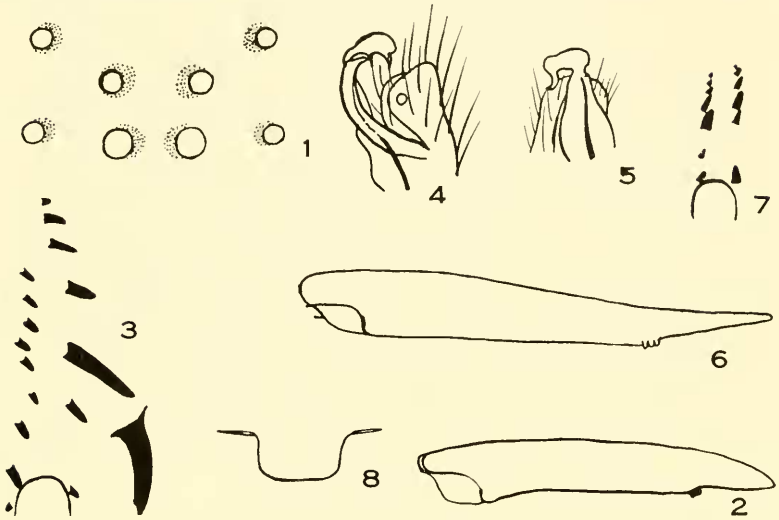
3. Without any dorsal tooth on fang near base; without any dorsal tooth on basal segment of chelicera near base of fang (*pallescens, vermiformis*) 4
4. Fang distinctly sinuate; a wide space between small teeth along margins of fang groove near base of fang and those more remote; chelicerae extending forward in a nearly horizontal position, nearly as long as cephalothorax ..... *pallescens*, p. 487
4. Fang not distinctly sinuate; space between small teeth near base of fang and those more remote along fang groove not unusually great; chelicerae less horizontal in position, not more than half as long as cephalothorax ..... *vermiformis*, p. 495
5. Basal segment of chelicera nearly as long as cephalothorax; with a dorsal tooth on basal segment of chelicera near base of fang.. *elongata*, p. 480
5. Basal segment of chelicera considerably shorter than cephalothorax; without any dorsal tooth on basal segment of chelicera near base of fang (*guatemalensis, harrodi, laboriosa, rusticana, versicolor*) 6
6. Abdomen conspicuously silvery on dorsal and dorsolateral sides; venter with a median dark stripe and a narrower silvery stripe on each side; lateral eyes as far apart as AME are from PME..... *laboriosa*, p. 486
6. Abdomen not conspicuously silvery on dorsal and dorsolateral sides; venter less distinctly striped; lateral eyes closer to one another than AME are to PME (*guatemalensis, harrodi, rusticana, versicolor*) ...7
7. Promargin of fang groove with a relatively large tooth between two small teeth near base of fang together with four relatively large teeth following a long toothless space (Fig. 39)..... *rusticana*, p. 489
7. Promargin of fang groove with teeth not arranged as stated above (*guatemalensis, harrodi, versicolor*) 8
8. Promargin of fang groove with about nine teeth and with a very long toothless space between second and third teeth; retromargin with about eight teeth ..... *versicolor*, p. 497
8. Promargin of fang groove with about five or six teeth and with no very long toothless space (*guatemalensis, harrodi*) 9
9. Both margins of fang groove with five teeth..... *harrodi*, p. 484
9. Both margins of fang groove with more than five teeth ..... *guatemalensis*, p. 482

N. B. The part of the key dealing with males, given in the preceding pages, should prove quite workable. It is a very difficult matter, however, to provide clearly workable keys for the identification of females because of the close similarities among the species and puzzling variations within each species. It is my opinion that these facts have not usually been sufficiently appreciated by those who have dealt with the taxonomy of this genus.

Tetragnatha caudata Emerton, 1884

(Figures 1-8)

Eucta lacerta Petrunkevitch, 1911
T. caudata Seeley, 1928
T. lacerta Roewer, 1942
T. caudata Kaston, 1948
T. caudata Levi, 1954



External Anatomy of *T. caudata*
(Figures 1-8)

Fig. 1. Eye group of male seen from in front.
Fig. 2. Outline of male abdomen to show "tail"; lateral view.
Fig. 3. Left male cheliceral teeth; ventrolateral view.
Figs. 4-5. Two different views of tip of left male palp to show form of conductor.
Fig. 6. Outline of female abdomen to show "tail"; lateral view.
Fig. 7. Left female cheliceral teeth; from below.
Fig. 8. Form of genital groove.

Male hypotype. Total length 8.80 mm., exclusive of the chelicerae whose basal segment is a little more than one half as long as the cephalothorax. The whole body is long and slender with

the abdomen extending posterior to the spinnerets to form a distinct "tail" (Fig. 2). The abdomen is notched at the base above. The lateral eyes are nearly twice as far from one another as AME are from PME (Fig. 1). Chelicerae: promargin of fang groove with seven teeth and retromargin with nine; the prolateral spur is not definitely bifid but it has a small tubercle beneath the apex (Fig. 3). Leg spines are few and fragile. Palp: both tibia and patella are short; exclusive of the distal chitinous extension on the tibia, the two segments are nearly equal in length; the termination of the conductor is best shown in Figures 4 and 5. Color: cephalothorax with a pair of dark dorsal parallel stripes; the sternum is broadly dark along the margins with a lighter central portion; abdomen with a moderately broad yellowish-brown ventral stripe; laterally and dorsally the abdomen has many light golden spangles.

Female hypotype. Total length, exclusive of the chelicerae 13 mm. The whole body is long and slender with the "tail" extending behind the spinnerets for more than one fifth the total length of the body (Fig. 6). Chelicerae: basal segment about half as long as cephalothorax, moderately robust; the promargin of the fang groove has six teeth and the retromargin has seven (Fig. 7); base of the fang with a low blunt cusp on the dorsal side; fang slightly sinuous. The abdomen is notched at the base above. The color is essentially like that of the male. The form of the genital groove is shown in Figure 8.

As in many other species in this genus, I have noted a rather disconcerting variation in the number and placement of the cheliceral teeth in both sexes of *T. caudata.*

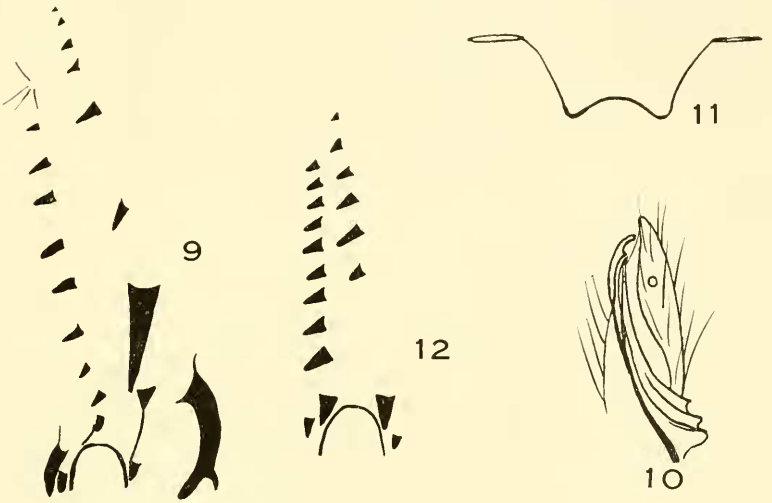
Collection records: The hypotypes are from Concord, Jackson Co., May 24, 1942. Other records are: Branch Co., Calhoun Co., Cheboygan Co., Emmet Co., Livingston Co., and Mecosta Co.

Tetragnatha elongata Walckenaer, 1805

(Figures 9-12)

T. grallator Emerton, 1884
T. elongata Seeley, 1928
T. elongata Comstock, 1940
T. elongata Kaston, 1948
T. elongata Levi, 1954

Male hypotype. Total length, exclusive of the chelicerae, 8.32 mm. Chelicerae: basal segment somewhat longer than cephalothorax; the prolateral spur is strongly bifid; promargin of fang groove with nine teeth and retromargin with eleven, and both rows with teeth irregularly placed; fang undulates from base to apex (considerable variation in numbers of teeth and their



External Anatomy of *T. elongata*
(Figures 9-12)

Fig. 9. Left cheliceral teeth of male from below.
Fig. 10. Tip of male palp to show apex of conductor and related parts.
Fig. 11. Form of genital groove of female.
Fig. 12. Left cheliceral teeth of female from below.

placement has been noted among numerous specimens) (Fig. 9). Lateral eyes much closer to one another than AME are to PME. Legs with many moderately long, slender spines. The abdomen is not notched at its base above. Palp: Tibia nearly twice as long as patella; cymbium rounded distally; conductor terminates as shown in Figure 10.

Female hypotype. Total length, exclusive of the chelicerae, 9 mm. Abdomen considerably swollen in anterior half. Chelicerae: about five-sevenths as long as cephalothorax; the fang is very sinuous and has a large dorsal basal tooth; the basal segment also has a small dorsal distal tooth (Fig. 12). The base of the abdomen is concave but is not notched. The form of the genital groove is shown in Figure 11.

Collection records. The hypotypes are from Conway, Emmet Co., August, 1937. Numerous specimens from both Upper and Lower Peninsulas. Seems to be fairly common.

Tetragnatha guatemalensis O. P. Cambridge, 1889

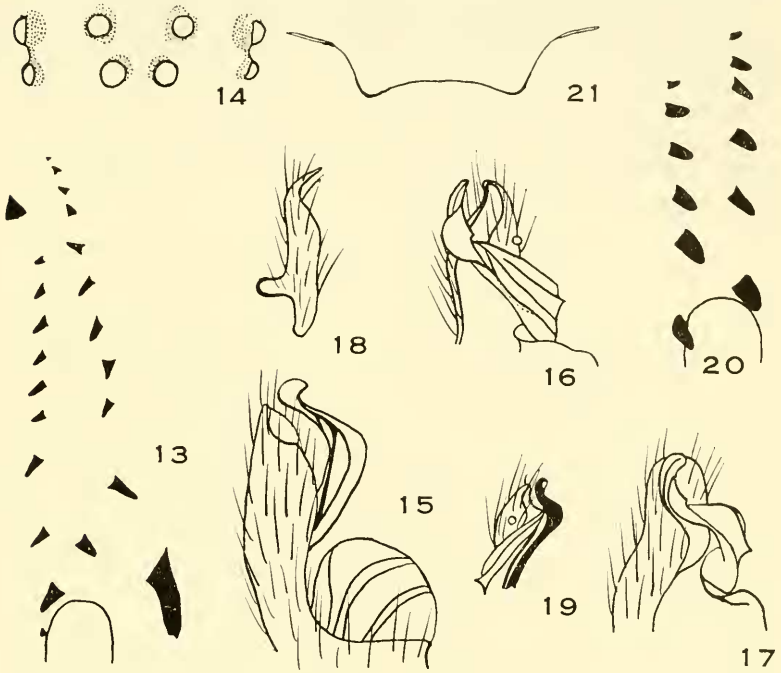
(Figures 13-21)

T. seneca Seeley, 1928
T. banksi Levi and Field, 1954
T. guatemalensis Roewer, 1942
T. guatemalensis Kraus, 1955
T. guatemalensis Chickering, 1957

In connection with my study of the genus *Tetragnatha* in Jamaica and other nearby islands (1957), I have already pointed out that I was compelled to consider *T. senoca* Seeley as a synonym for *T. guatemalensis* O. P. Cambridge. In connection with my study of the genus in Michigan I have again had this question under consideration and once more I have been driven to the same conclusion unlikely as it may seem. Drs. Levi and Field (1954) have apparently agreed that *T. seneca* Seeley is the same as *T. banksi* McCook, 1893.

Male hypotype. Total length, exclusive of the chelicerae, 7.8 mm. Chelicerae: basal segment about as long as the cephalothorax; there are eleven teeth along the promargin of the fang groove and ten along the retromargin but variations in number have been noted among numerous specimens; the prolateral spur is not clearly bifid but is bevelled distally (Fig. 13). Eyes: viewed from above, both rows recurved; central ocular quadrangle considerably wider behind than in front; lateral eyes much closer to one another than AME are to PME; ratio of eyes AME : ALE : PME : PLE = 12 : 9 : 10 : 10; lateral eyes separated from one another by slightly more than the diameter

of PLE (Fig. 14). Color quite dark and folium rather indistinct. Palp: tibia longer than patella in ratio of about 40 : 23, but both are of moderate length; the paracymbium terminates in a



External Anatomy of *T. guatemalensis*
(Figures 13-21)

Fig. 13. Left male cheliceral teeth from below.
Fig. 14. Eyes of male from in front.
Figs. 15-17. Distal end of left male palpal tarsus in different views.
Fig. 18. Paracymbium of male to show characteristic termination.
Fig. 19. Apex of right male palpal tarsus.
Fig. 20. Left female cheliceral teeth from below.
Fig. 21. Form of genital groove of female.

slender digital extension, apparently found in no other species in North or Central America (Fig. 18); the conductor terminates in a very characteristic form (Figs. 15-17, 19).

Female hypotype. Total length, exclusive of the chelicerae, 7.475 mm. Chelicerae: basal segment a little more than one-half the length of the cephalothorax; both margins of the fang groove with six teeth (Fig. 20); the fang has a very small basal dorsal cusp; the inner margin of the fang is irregular but without teeth. The form of the genital area is shown in Figure 21 (somewhat distorted in hypotype because of shrinkage of the specimen).

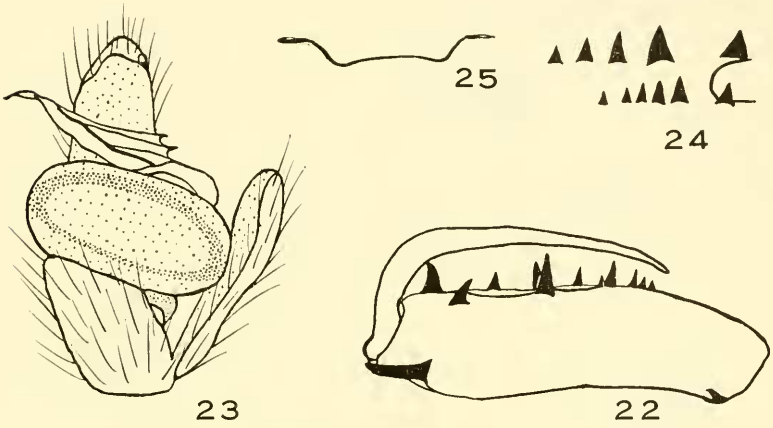
Collection records. The male and female hypotypes are from Emmet County, July and August, 1938 and 1937, respectively. Other specimens in my collection are from Emmet, Cheboygan, Mecosta, and Calhoun Counties.

Tetragnatha harrodi Levi, 1951

(Figures 22-25)

Male hypotype. Total length, exclusive of the chelicerae 6.175 mm. Chelicerae: basal segment 1.755 mm. long; about two-thirds as long as the cephalothorax; the promargin of the fang groove has six teeth, the last three of which are small and close together; the retromargin has six teeth, the last two of which are small and close together; the prolateral spur is rather blunt at the apex and without any definite bifidity (Fig. 22). The lateral eyes are only a little more than two-thirds as far from one another as AME are from PME. Ratio of eyes AME : ALE : PME : PLE = 9.5 : 8 : 10 : 8. Central ocular quadrangle wider behind than in front in ratio of about 9 : 7. Width of clypeus equal to a little more than 1.5 times the diameter of AME. Base of abdomen somewhat swollen. Color: carapace reddish brown without distinct markings; sternum yellowish without distinct markings; legs, chelicerae, and palps light reddish brown; abdomen light with many small silvery flecks on dorsum, with narrow broken black lines alternating with narrow broken light lines along lateral sides, and with venter light with fine silvery flecks. Palp: tibia and patella short with tibia longer than patella in ratio of about 4 : 3; the paracymbium is blunt apically; the conductor terminates in a slender, somewhat twisted spine; the bulb is broad and short (Fig. 23).

Female hypotype. Total length, exclusive of the chelicerae, 5.20 mm. Color: essentially as in male but there are black dorsolateral spots and stripes of variable size and shape. The chelicerae are about one-third as long as the cephalothorax; the cheliceral teeth are as represented in Figure 24. The abdomen is somewhat swollen about one-third back from base. The genital



External Anatomy of *T. harrodi*
(Figures 22-25)

Fig. 22. Prolateral view of left chelicera with teeth.
Fig. 23. Distal end of left male palp; lateral view.
Fig. 24. Left female cheliceral teeth.
Fig. 25. Form of the genital groove of female.

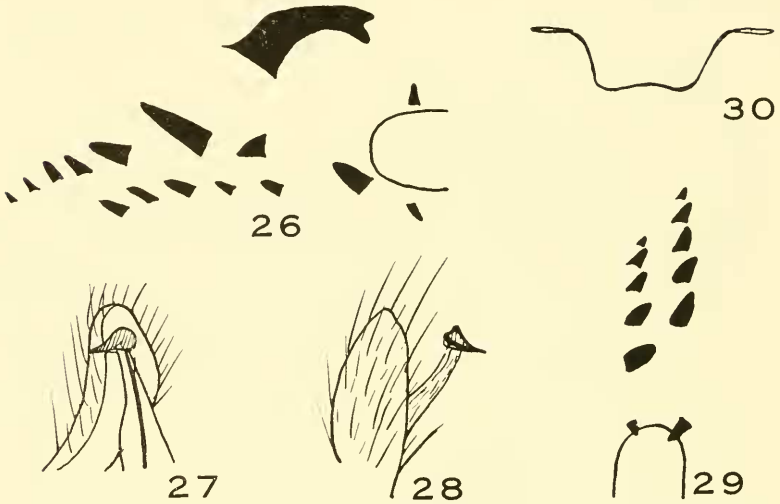
groove is essentially as represented in Figure 25. The specimen is probably not mature and, hence, some of its most important features may not be evident.

Collection records. The hypotypes are from Bay View, Emmet Co., August, 1941. No other specimens have yet appeared in my collection.

Tetragnatha laboriosa Hentz, 1850

(Figures 26-30)

T. illinoisensis Keyserling, 1879
T. alba F. P. Cambridge, 1903
T. alba Petrunkevitch, 1911
T. laboriosa Petrunkevitch, 1911
T. laboriosa Kaston, 1948
T. laboriosa Levi, 1954



External Anatomy of *T. laboriosa*
(Figures 26-30)

Fig. 26. Left chelicéral teeth of male.
Figs. 27, 28. Two different views of the apex of the male cymbium and conductor.
Fig. 29. Left female chelicéral teeth.
Fig. 30. Form of female genital groove.

I have already indicated in a previous paper that I first became aware that *T. alba* F. P. Cambridge is a synonym of *T. laboriosa* Hentz when Dr. W. J. Gertsch suggested this in notes on certain species of the genus from Panama.

Male hypotype. Total length, exclusive of chelicerae, 5.07 mm. Chelicerae: basal segment about four-sevenths as long as cephalothorax; the prolateral spur is bifid; the promargin of the fang groove has about eight teeth including the "large tooth"; the retromargin has about seven (differences between numbers on right and left sides have been noted); the fang is slightly bent (Fig. 26). The lateral eyes are about as far apart as AME are from PME. Legs with numerous short slender spines. Palp: tibia a little longer than patella but both are short (ratio about 7 : 5); conductor as shown in Figures 27 and 28.

Female hypotype. Total length, exclusive of the chelicerae, 5.75 mm. Chelicerae: basal segment about half as long as cephalothorax; relatively robust; promargin of fang groove with six teeth; retromargin with six but the two sides are not in full agreement (Fig. 29); considerable variation has been noted in respect to numbers of cheliceral teeth in different specimens. Color: with a well defined folium; conspicuously silvery on dorsal and dorsolateral sides; there is a midventral dark brown or black stripe with a silvery stripe on each side of it. The form of the genital groove is shown in Figure 30.

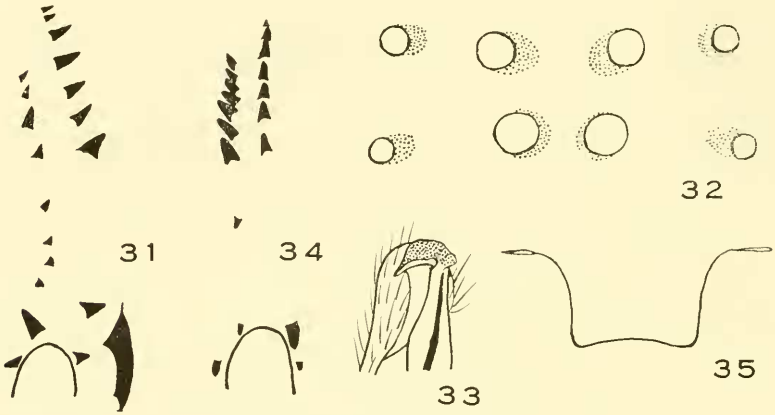
Collection records. This seems to be our commonest species. It is in my collection from many parts of the state, both Upper and Lower Peninsulas. The species is often found in large numbers in webs built among grass tops at some distance from water. Seeley (1928) reported it as being abundant in an oat field just before the grain was cut.

Tetragnatha pallescens F. P. Cambridge, 1903

(Figures 31-35)

T. pallida Banks, 1892
T. pallescens F. P. Cambridge (*pallida* preoccupied by O. P. Cambridge, 1889)
Eugnatha pallescens Petrunkevitch, 1911
T. pallescens Seeley, 1928
T. pallescens Comstock, 1940
T. pallescens Kaston, 1948
T. pallescens Levi, 1954

Male hypotype. Total length, exclusive of the chelicerae, 8 mm. Chelicerae; basal segment about as long as cephalothorax; teeth along fang groove as shown in Figure 31 (minor differences noted between right and left sides); prolateral spur not distinctly bifid but there is a small tooth below the apex; the fang is slightly sinuate; there is no "large tooth" on the promargin. The lateral eyes are further from one another than AME are from PME in ratio of about 26 : 15 (Fig. 32). Palp: tibia longer than



External Anatomy of *T. pallescens*
(Figures 31-35)

Fig. 31. Left male cheliceral teeth from below.
Fig. 32. Eye-group of male from in front.
Fig. 33. Tip of conductor of male palp.
Fig. 34. Left female cheliceral teeth from below.
Fig. 35. Form of the genital groove in the female.

patella in ratio of about 9 : 5; the conductor has a very characteristic, somewhat sickle-shaped apex (Fig. 33). The base of the abdomen is notched.

Female hypotype. Total length, exclusive of the chelicerae, 10.40 mm. Chelicerae: basal segment about four-fifths as long as cephalothorax; extend forward nearly horizontal; promargin of fang groove with nine teeth and retromargin with ten (Fig. 34); with no more than tips of fangs covered by maxillae when

the former are folded; fang only slightly sinuate and without any dorsal basal cusp. The eyes are like those of male. Abdomen: gently notched at base; long and slender; somewhat swollen in anterior third; very slightly extended posterior to spinnerets. Color: the carapace has a faint median dark stripe constricted at the median thoracic pit and also a faint marginal stripe; the dorsum has many small silvery spangles much less conspicuous than in *T. laboriosa;* the lateral abdominal sides have many of these spangles and irregular brownish spots; the venter has a faint brownish median stripe. The genital groove is as shown in Figure 35.

Collection records. Seems to be fairly common in Michigan; usually taken in marsh grass and around bodies of water. Emerton observed them mating in early September. The species is in my collection from numerous localities in the Lower Peninsula.

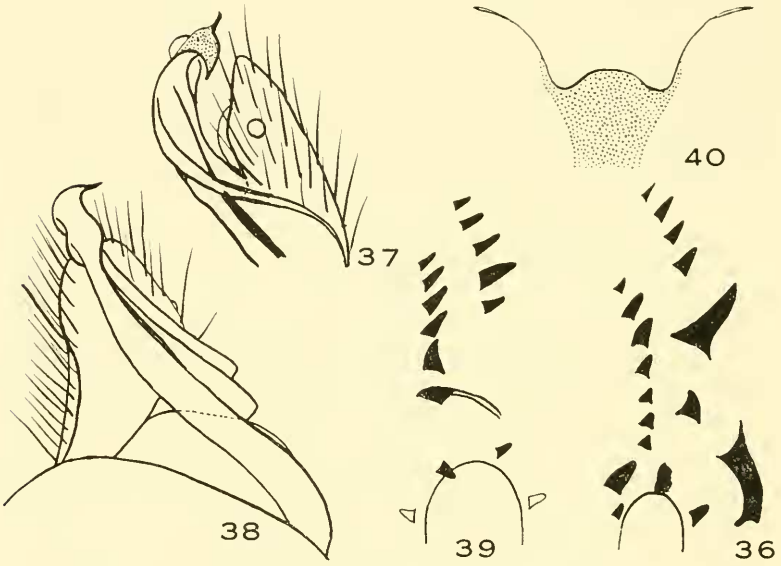
Tetragnatha rusticana sp. nov.

(Figures 36-40)

Male holotype. Total length, exclusive of the chelicerae, 6.7 mm.; including chelicerae 8.0 mm. long. Carapace 2.60 mm. long, 1.56 mm. wide opposite second coxae where it is widest; with the usual form and with the median depression which is a pit rather than a groove and somewhat wider than long.

Eyes. Eight in two rows as usual; ocular tubercles moderately developed; viewed from above, both rows moderately recurved: viewed from in front, anterior row nearly straight and posterior row slightly procurved, both measured by centers. Central ocular quadrangle wider behind than in front in ratio of about 4 : 3. Ratio of eyes AME : ALE : PME : PLE = 8 : 5.5 : 9 : 7. AME separated from one another by about five-fourths of their diameter, from ALE by about nine-fourths of their diameter. PME separated from one another by nearly twice their diameter, from PLE by slightly more than twice their diameter. Laterals separated from one another by about 1.5 times the diameter of AME. AME separated from PME by a little less than twice their diameter, hence further apart than ALE are from PLE.

Chelicerae. Well developed; moderately porrect; quite divergent in distal two-thirds; considerably swollen in distal half; quite concave along outer border; a little less than two-thirds as long as cephalothorax; fang is long, slender, and only slightly sinuate; prolateral spur definitely bifid with lower division the more robust; the promargin of the fang groove has the "large tooth" together with six others; the retromargin has a total of nine teeth all spaced essentially as shown in Figure 36.



External Anatomy of *T. rusticana* sp. nov.
(Figures 36-40)

Fig. 36. Left male cheliceral teeth from below.

Figs. 37, 38. Two different views of the apex of the male palpal tarsus to show distinctive features of the conductor.

Fig. 39. Left female cheliceral teeth from below.

Fig. 40. Form of the female genital groove.

Maxillae. Nearly parallel; moderately broadened distally; with ridge and groove extending somewhat obliquely along posterior surface; longer than lip in ratio of about 7 : 3; more than four times as long as wide in middle.

Lip. Wider at base than long in ratio of about 4 : 3; strongly chitinized and rough except at distal border which is conspicuously separated from remainder; sternal suture gently procurved; sternal tubercles at ends of sternal suture short and bluntly pointed.

Sternum. Convex; narrowly scutiform; longer than wide in ratio of 4 : 3; continued by a narrow sclerite between fourth coxae which are separated by a little less than one-third of their width.

Legs. 1423. Width of first patella at "knee" .264 mm., tibial index of first leg 4. Width of fourth patella at "knee" .242 mm., tibial index of fourth leg 5.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	5.785	1.040	6.175	6.500	1.625	21.125
2.	4.160	.890	3.185	4.275	.975	13.435
3.	2.360	.460	1.430	1.820	.650	6.720
4.	4.680	.845	4.030	4.420	.910	14.885
Palp	1.690	.455	.660	——	.975	3.780

Numerous moderately long and slender spines together with a moderately well-developed coat of hair are present on all legs. It is difficult to distinguish, without special study, the long and slender erect hairs particularly numerous on the posterior legs from true trichobothria.

Palp. The tibia is longer than patella in about the ratio of 3 : 2 but both are of moderate length; both cymbium and paracymbium are of usual shape without especially distinctive features. The distinctive features of the conductor are probably best shown in Figures 37, 38.

Abdomen. 4.355 mm. long; slender and not swollen in any region; extends a short distance posterior to spinnerets; unnotched at base.

Color in alcohol. Carapace, legs, and nearly all mouth parts appear to be of varying shades of yellowish brown. The lip is brown with distal yellowish border. The sternum is colored more deeply around its periphery but is also yellowish brown in general. Abdomen: dorsally and dorsolaterally there are many

golden spangles with a faintly outlined iridescent striping with a reddish tinge along lateral sides; the venter is also moderately well covered by golden spangles with just a suggestion of a brown median stripe which is prominent in the female.

Female allotype. Total length, exclusive of the chelicerae, 8.125 mm.; including chelicerae the length is 8.45. Carapace 2.5 mm. long, 1.625 mm. wide opposite second coxae where it is widest; median thoracic depression very shallow.

Eyes. Ratio of eyes AME : ALE : PME : PLE = 10 : 6 : 8.5 : 6.5. AME separated from one another by nine-tenths of their diameter, from ALE by a little more than twice their diameter. PME separated from one another and from PLE by a little more than twice their diameter. ALE separated from PLE by a little less than twice the diameter of PLE; AME separated from PME by a slightly greater distance. Height of clypeus equal to about 1.5 times the diameter of AME.

Chelicerae. Well developed; only moderately porrect; quite divergent; outer border only slightly concave; fang groove with seven teeth along promargin and eight along retromargin, spaced as indicated in Figure 39. Fang slightly sinuate and bent rather sharply about the middle; with a low blunt basal dorsal cusp.

Maxillae. Nearly parallel; moderately broadened distally; covering tips of fangs when the latter are folded; somewhat concave along outer borders; about .88 mm. long; longer than lip in ratio of about 5 : 2; longer than wide in middle in ratio of about 8 : 3.

Lip. Wider at base than long in ratio of about 4 : 3; strongly chitinized and rough except at distal border; sternal suture plainly procurved and with the usual sternal tubercles at ends of suture.

Sternum. Convex; narrowly scutiform; longer than wide in ratio of 5 : 4; continued as a narrow sclerite between fourth coxae which are separated by a little less than one fourth of their width.

Maxillae. Nearly parallel; moderately broadened distally; covering tips of fangs when the latter are folded; somewhat concave along outer borders; about .88 mm. long; longer than lip in ratio of about 5 : 2; longer than wide in the middle in ratio of about 8 : 3.

Lip. Wider at base than long in ratio of about 4 : 3; strongly chitinized and rough at distal border; sternal suture plainly procurved and with usual sternal tubercles at ends of suture.

Sternum. Convex; narrowly scutiform; longer than wide in ratio of about 5 : 4; continued as a narrow sclerite between fourth coxae which are separated by a little less than one-fourth of their width.

Legs. 1243. Width of first patella at "knee" .308 mm., tibial index of first leg 5. Width of fourth patella at "knee" .220 mm., tibial index of fourth leg 7.

	Femora	Patellae	Tibiae	Metatarsi	Tarsi	Totals
	(All measurements in millimeters)					
1.	4.875	1.170	5.005	5.395	1.235	17.680
2.	3.575	.912	2.925	3.347	.910	11.669
3.	1.755	.520	1.170	1.430	.552	5.427
4.	3.780	.650	2.600	3.250	.715	10.995

Leg spines, hair, and trichobothria essentially as in male. Palpal claw as usual with a robust terminal tooth and a single row of slender teeth.

Abdomen. 6.175 mm. long; somewhat swollen in anterior half; extended somewhat posterior to spinnerets; acutely notched at base. The form of the genital groove is shown in Figure 40.

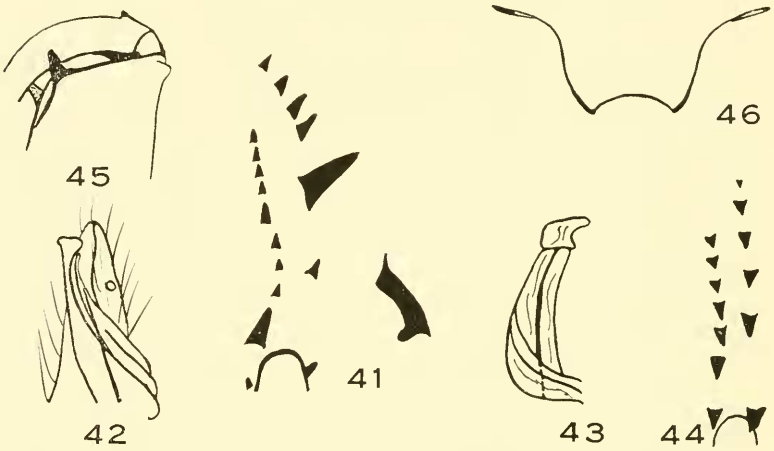
Color in alcohol. Carapace light yellowish-brown with a broad dusky stripe on each side diverging from the median pit to the lateral eyes. The sternum is brown with a median triangular spot reaching from the base of the lip for about there-fourths of the length of that part of the body. The lip is brown with a yellow border. The other mouth parts are varying shades of yellowish-brown. The legs are generally light yellowish-brown but the first femora are dusky gray beneath. Abdomen: the folium is well outlined and colored a rich reddish brown with small golden spangles; on each lateral side there is a dorsolateral silvery stripe and a ventrolateral brownish stripe with small golden spangles; the venter has a median dark brown stripe with a silvery stripe on each side of it; from the base of the anterior spinnerets a narrow dark brown stripe diverges to merge with the ventrolateral brown stripe.

Type locality. Both holotype and allotype are from Bay Co., Michigan, June, 1950, collected by R. R. Dreisbach. Paratypes of both sexes are in my collection from Aranac, Bay, Emmet, Huron and Washtenaw counties.

Tetragnatha straminea Emerton, 1884

(Figures 41-46)

Eugnatha straminae Petrunkevitch, 1911
T. straminea Seeley, 1928
T. straminea Kaston, 1948
T. straminea Levi, 1954



External Anatomy of *T. straminea*
(Figures 41-46)

Fig. 41. Left male cheliceral teeth from below.
Fig. 42. Distal ends of conductor and cymbium.
Fig. 43. Distal end of conductor with cymbium removed; turned at right angles to Figure 42.
Fig. 44. Left female cheliceral teeth from below.
Fig. 45. Distal end of chelicera to show cusps at base of fang and basal segment of chelicera.
Fig. 46. Form of genital groove in female.

Male hypotype. Total length, exclusive of the chelicerae, 7.605 mm. Lateral eyes clearly further from each other than AME are

from PME. Slender throughout. Chelicerae: basal segment about half as long as cephalothorax; promargin with seven teeth including the "large tooth"; retromargin with ten teeth; the prolateral spur is distinctly bifid (Fig. 41); the fang is evenly curved. A little more than the tips of the fangs are hidden by the maxillae when the former are folded. Abdomen: shallowly notched at base; colored dorsally much like *T. laboriosa*; with a median ventral brownish stripe and a broad spangled stripe on each side. Palp: tibia twice as long as the patella; paracymbium curved and bluntly rounded distally; termination of conductor difficult to see but Figures 42 and 43 probably give a fairly accurate illustration of it.

Female hypotype. Total length, exclusive of the chelicerae, 8.45 mm. Eyes as in male. Abdomen plainly notched at base and slightly extended posterior to spinnerets. Maxillae hide a considerable portion of the fangs when the latter are folded. Chelicerae: fang with a small but distinct dorsal basal cusp; basal segment with a distinct blunt cusp near base of fang; promargin of fang groove with six teeth; retromargin with seven teeth (Figs. 44, 45). The form of the genital groove is shown in Figure 46. In collections this species frequently seems to have been confused with *T. laboriosa*.

Collection records. The hypotypes are from Albion, Calhoun Co., June, 1932. The species is in my collection from many localities in the Lower Peninsula and from Mackinac and Marquette counties in the Upper Peninsula.

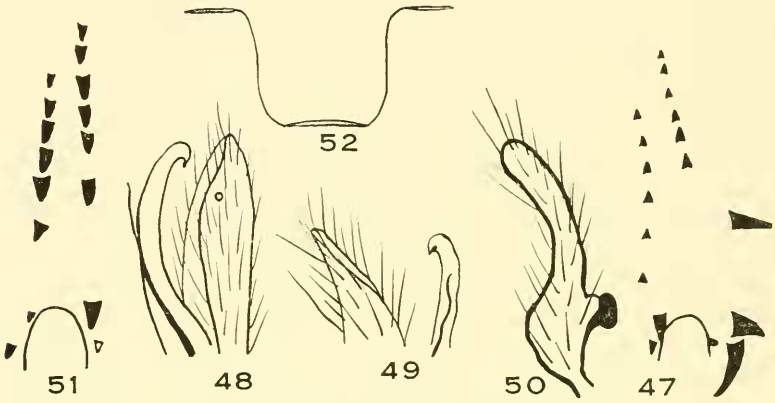
Tetragnatha vermiformis Emerton, 1884

(Figures 47-52)

Eucta vermiformis Petrunkevitch, 1911
T. vermiformis Seeley, 1928
T. vermiformis Kaston, 1948
T. vermiformis Levi and Field, 1954
T. vermiformis Chickering, 1957

Male hypotype. Total length, exclusive of the chelicerae, 7.605 mm. Lateral eyes nearly twice as far from one another as AME are from PME. Chelicerae: basal segment about seven-ninths as long as the cephalothorax; the prolateral spur is not bifid; the fang is somewhat sinuate; the promargin of the fang groove has

nine teeth with two set far out of line; the retromargin has eight teeth (Fig. 47). Palp: both tibia and patella are short and nearly equal with tibia slightly the longer if the chitinous extension is included; the paracymbium is slender and gently curved in the distal half; the distal end of the conductor is characteristically hook-shaped (Figs. 48-50). The base of the abdomen is just slightly notched. The abdomen is silvery with gray reticulations and no folium dorsally.



External Anatomy of *T. vermiformis*
(Figures 47-52)

Fig. 47. Left male cheliceral teeth from below.

Figs. 48, 49. Two views of distal ends of cymbium, conductor, and embolus.

Fig. 50. Paracymbium of male.

Fig. 51. Left female cheliceral teeth from below.

Fig. 52. Form of the genital groove of female.

NOTE: Figs. 51, 52 are taken from Emerton's type specimen.

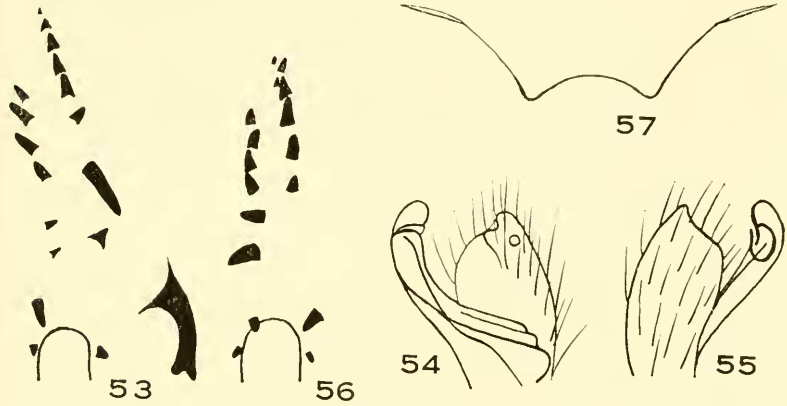
Female hypotype. Total length, exclusive of the chelicerae, 7.41 mm. Eyes essentially as in male. Chelicerae: basal segment less than one-half as long as cephalothorax; promargin of fang groove with eight teeth; retromargin also with eight teeth (Fig. 51); only tips of fang hidden by maxillae when the former are folded; fang slightly sinuate; outer border of basal segment only slightly concave. Genital groove essentially as shown in Figure 52.

Collection records. Levi and Field (1954) had only McCook's original "Wisconsin" record. The Michigan hypotypes are from Calhoun Co., Sept., 1933. Other specimens are in my collection from Bay, Branch, Calhoun, Emmet, Huron, and Mecosta counties. It appears to be uncommon; usually taken in marsh grass.

Tetragnatha versicolor Walckenaer, 1841

(Figures 53-57)

T. extensa Emerton, 1884
T. dentigera F. P. Cambridge, 1903
T. extensa Petrunkevitch, 1911
T. extensa Seeley, 1928
T. extensa Comstock, 1940
T. versicolor Kaston, 1948
T. versicolor Levi and Field, 1954



External Anatomy of *T. versicolor* (Figures 53-57)..

Fig. 53. Left male cheliceral teeth from below.
Fig. 54-55. Two views of the distal end of the cymbium and conductor of the male palp.
Fig. 56. Left female cheliceral teeth from below.
Fig. 57. Form of the genital groove in the female.

Male hypotype. Total length, exclusive of the chelicerae, 6.955 mm. Chelicerae: basal segment slightly more than four-

fifths as long as cephalothorax; prolateral spur clearly bifid; the promargin of the fang groove has nine teeth with the most proximal very small; the retromargin has eight (Fig. 53); the fang is not sinuate. Lateral eyes closer to one another than AME are to PME. Leg spines numerous, long, and slender. Palp: tibia longer than patella in ratio of 2 : 1; distinctive conductor shown in Figures 54 and 55. The base of the abdomen is not notched. The color and markings are highly variable but are, in general, similar to those of the female.

Female hypotype. Total length, exclusive of the chelicerae, about 9.425 mm. Abdomen clearly notched at base. Chelicerae: a little more than half as long as cephalothorax; fang only slightly sinuate; promargin of fang groove with nine teeth and the last three out of line; the retromargin has eight teeth (Fig. 56); a considerable amount of variation has been noted in the number of teeth along the fang groove in different specimens. The form of the genital groove is shown in Figure 57.

Collection records. The male hypotype is from Calhoun Co., May, 1942; the female hypotype is from Emmet Co., August, 1937. Other specimens are in my collection from many localities in the Lower Peninsula and from several localities in Marquette County in the Upper Peninsula.

BIBLIOGRAPHY

Banks, N.

1907. A Preliminary List of the Arachnids of Indiana, with Keys to Families and Genera of Spiders. Annual Report (for 1906) of Dept. of Geol. and Natural Resources of Indiana, **31**: 715-747.

Barrows, W. M.

1918. A List of Ohio Spiders. Ohio Jour. Sci., **18**(8): 297-318.

Cambridge, O. P. and F. P. Cambridge

1889-1905. Arachnida-Araneida. Vols. I-II. *In:* Biologia Centrali-Americana. Dulau & Co., London.

Chickering, A. M.

1952. A Revision of the Families of Spiders of Michigan. Papers Michigan Acad. Sci., Arts, Lett., **36**: 119-139.

1957. Notes on Certain Species of *Tetragnatha* (Araneae, Argiopidae) in Central America and Mexico. Breviora, Mus. Comp. Zool., **67**: 1-4.

1957. The Genus *Tetragnatha* (Araneae, Argiopidae) in Jamaica, B. W. I., and Other Neighboring Islands. Breviora, Mus. Comp. Zool., **68**: 1-15.

1957. The Genus *Tetragnatha* (Araneae, Argiopidae) in Panama. Bull. Mus. Comp. Zool., **116**(5): 301-354, 108 figures.

COMSTOCK, J. H.

1940. The Spider Book. Revised and edited by W. J. Gertsch. Doubleday, Doran & Company, Inc., New York.

EMERTON, J. H.

1884. New England Spiders of the Family Epeiridae. Trans. Connecticut Acad., **6**: 1-86.

KASTON, B. J.

1948. Spiders of Connecticut. State of Connecticut. State Geological and Natural History Survey, Bull. **70**: 1-874.

LEVI, HERBERT W. and HOWARD M. FIELD

1954. The Spiders of Wisconsin. Amer. Midland Natur., **51**(2): 440-467.

PETRUNKEVITCH, A.

1911. A Synonymic Index-Catalogue of Spiders of North, Central, and South America, etc. Bull. Amer. Mus. Nat. Hist., **29**: 1-809.

ROEWER, C. FR.

1942. Katalog der Araneae. **1**: 1-1040. Bremen.

SEELEY, R. M.

1928. Revision of the Spider Genus *Tetragnatha*. New York State Mus. Bull., **278**: 99-150.

WORLEY, L. G. and G. B. PICKWELL

1931. The Spiders of Nebraska. Univ. Nebraska Studies (for 1927), **27**(1-4): 1-127.